

Rules for Sail Assisted Ships

July 2021

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A guide to the Rules

and published requirements

Rules for Sail-Assisted Ships

Introduction

The Rules are published as a complete set.

Rules updating

The Rules are published periodically and changed through a system of Notices between releases.

July 2021

PLEASE NOTE: No technical changes have been made to this Rule set, only the date has been updated.

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CHAPTER 1 RULES FOR SAIL-ASSISTED SHIPS

SECTION 1 GENERAL

Section

1 General

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1.1 Application

1.1.1 These requirements apply to sea-going ships incorporating sails or other wind propulsion generating devices which are not intended as the primary means of propulsion. It is assumed that apart from the sail systems installations, the vessels are of conventional steel construction, and as such will comply with the requirements of the relevant Parts and Chapters of the *Rules and Regulations for the Classification of Ships* (hereinafter referred to as the Rules for Ships), in all other respects.

1.2 Design considerations

1.2.1 Attention is drawn to the special stability considerations and other requirements of the National Authority with whom the ship is registered, together with any special requirements of the Administrations within whose territorial jurisdiction the ship is intended to operate.

1.2.2 It is the Builder's responsibility to ensure that the propulsive machinery fitted to the ship is of sufficient power to ensure adequate manoeuvrability of the vessel in all conditions, including that with sail systems inoperative. Further, the propulsive machinery should, in general, be capable of operating in all conditions of heel and trim which may result from operation of the sail systems.

1.2.3 A control system is to be provided so that the setting and trimming of sails may be carried out from the bridge, and is to be such that, once established, the desired setting and trimming may be automatically maintained. The control system is to provide adequate speed of response to automatically neutralize the sail system in the event of wind conditions which may damage the sail system and endanger the ship.

1.2.4 In the case of ships carrying low flash point or other hazardous cargoes, due consideration is to be given to the materials of construction of sail systems and their location in relation to the hazardous areas, in order to minimize the risk of ignition of flammable vapours/gases.

1.2.5 The service speed, V , used in the derivation of rudder and sternframe scantlings in the Rules for Ships, is to be taken as the maximum estimated speed, in knots, with the ship in the loaded condition with any possible combination of sail and propulsion systems.

1.3 Class notations

1.3.1 Ships complying with these requirements will, in general, be eligible for the class notation **Sail Assisted**, e.g:

- 100A1 Bulk Carrier Sail Assisted.

The classification will extend to the masts and all associated supporting structure and will include the sail systems. If, for any reason of design, construction or materials it is considered inappropriate to class the sail systems, then reference to the sail systems will be omitted from the class of the ship and the descriptive note **Sail Assisted** may be inserted in column 6 of the *Register Book*.

1.4 Structural arrangements

1.4.1 The scantlings and arrangements of the ship are to be as required for the particular ship type in the relevant Chapter of *Pt 4 Ship Structures (Ship Types)* of the Rules for Ships.

1.4.2 Masts, posts and other supporting structures are to have adequate strength to resist the highest design loading which must be not less than that imposed by the sail systems in the normal working conditions and in any emergency conditions. Design, construction, stiffening and thickness of masts and posts will be considered in each case, and these will require to be adequate to prevent buckling under all conditions of loading. Particular attention is to be given to the integration of these items into the structure of the hull. In general, it is envisaged that main sail supporting masts will be carried through the main strength deck and extended below to a second deck or equivalent structure. They are to be efficiently connected to the decks and to transverse bulkhead in way. The hull structure in way is to be reinforced and stiffened locally to ensure adequate strength and resistance to

plate buckling. In the case of designs involving multi-post arrangement, special consideration will be given to the integration of the posts into the ship structure.

1.4.3 Steel for masts, posts and other associated supporting structures is to comply with the requirements of *Pt 3, Ch 2 Materials* of the Rules for Ships. The grade of steel will be considered in each case, but is in general to correspond to material class III.

1.4.4 Where used to support masts or posts carrying sail systems, wire rope stays are to be in one length and have suitable strength and construction. Pretensioning of stays should, in general, be not less than 30 N/mm² (3,0 kgf/mm²).

1.5 Information to be submitted

1.5.1 In addition to the plans and information required in other parts of the Rules for Ships, the following additional details are to be supplied:

- The intended service areas.
- Plans and full particulars of the sail systems showing materials and methods of construction, means of attachment to masts and any secondary means of support.
- Supporting calculations in respect of the strength of the sail systems.
- Plans of masts, including details of staying and/or integration into ship's structure.
- Full information regarding design parameters, including relevant environmental data and limiting operating conditions, lift and drag coefficients and resulting force variations and distributions throughout the range of operating angles of the sail systems. These data should be supported by results from appropriate testing.
- Full particulars and plans of automatic operating systems.

1.6 Survey requirements for sail systems

1.6.1 The sail systems and their associated structure and equipment are to be examined and tested during construction and under working conditions on completion of the installation. Periodical Surveys of these items are, in general, to be arranged to coincide with hull and machinery surveys as required by the Rules for Ships.

1.6.2 When the sail system is not included in the class of ship, LR will, when requested, carry out examination and testing of the system, associated structure and equipment during construction, under working conditions, on completion and periodically as required.

1.6.3 Where service experience with a proposed system is limited or a system incorporates novel design aspects or materials, the frequency of survey will be specially considered.

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